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ABSTRACT

For 8 years, the Community College of Allegheny County has offered a non-traditional science course, Chemistry of Art, which enables students to appreciate more fully the bonds and commonalities existing between the sciences and the arts, where creativity is common to both and where hands-on experience, visualization, and critical thinking can become one. Significant emphasis is placed on making non-science students aware that they are chemists in their fields and science students realize their artistic potential. Major concepts covered in the course are: (1) the language of chemistry, including the art of the periodic table, atoms and elements, chemical reactions, and balancing equations; (2) chemistry of textiles; (3) paint chemistry; (4) chemistry of photography; (5) physics and chemistry of color; and (6) Leonardo da Vinci as artist and scientist. Students work in the chemistry laboratory, where they perform experiments with measurement, pigment preparation, glass sculpture, solvent effect on fibers, and the Ph of everyday chemicals. In the art/photography laboratory they experiment with mixing light colors, using photography with a microscope, using the camera as an instrument of science and art, and developing film. In many cases students have pursued a new direction of studies after completion of the course. (KRN)

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Linking Bonds Between Art and Chemistry

by
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One of the most important curricular area that provides a foundation for critical, logical, and creative thinking is chemistry. This statement is also true, if when repeated verbatim, the word 'art' is replaced with the word 'chemistry.'

Traditionally, chemistry has been used to teach scientific concepts that require a mathematical background sprinkled with logical and abstract thinking. The chemistry laboratory served as a focal point of activities and outcomes for the concept objectives. The traditional artists' laboratory, similar to the chemists' laboratory, too, allowed for logical and abstract thinking processes in generating tangible products. Creativity, although difficult to quantify, always infiltrated the dynamics in both chemistry and art experiences. In essence, many bonds that link those areas have always existed but remained segregated as subject areas.

During the past eight years the Community College of Allegheny County has been instrumental in enhancing the learning experiences of both science and non-science students with a non-traditional science course, Chemistry of Art. An essential specialty of the course is the constant interplay between a variety of concepts that link

the bonds between the sciences and the field of art. Chemical principles such as atomic structure, electrovalent and covalent bonding, chemical reactions, and properties of light and color are interwoven with canvas board, paint brushes, microscopes, and cameras.

Non-science majors usually schedule a non-laboratory science elective, tend to avoid chemistry, and may not feel comfortable with the level of mathematics required to experience success in a traditional chemistry course. In the Chemistry of Art course minimal mathematics is used in presentations. Instead, significant emphasis is placed on making the art of non-science oriented people aware that they are indeed chemists in their fields. At the same time, the science oriented people realize their artistic potential. The linking bonds in this course help the "Chemartists" dismiss stereotyping of either a chemist or an artist.

Chemistry of Art offers hands-on experiences that allow for imaging, producing, and linking concepts of art and chemistry.

MAJOR CONCEPTS

Major concepts include:

A. The language of chemistry

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- Art of the periodic table
- Atoms and elements
- Atomic structure
- Electronic configuration
- Bonding
- Nomenclature
- Chemical reactions
- Balancing equations
- B. Chemistry of textiles
 - Natural fibers
 - Synthetic fibers
 - Acids and bases
- C. Paint chemistry
 - Ingredients
 - Health related hazards
 - Solutions
- D. Chemistry of photography
 - Electromagnetic spectrum
 - Properties of light
- E. Physics and chemistry of color
 - Light primaries
 - Pigment primaries
- F. Leonardo da Vinci
 - The artist
 - The scientist

LABORATORY

Laboratory experiences include working in the chemistry and photography/art laboratories.

- A. Experiments performed primarily in the chemistry lab include:
 - Safety as a chemist
 - Measurements
 - Flame tests
 - Pigment preparation
 - Chemical reactions
 - Glass sculpture
 - Solvent effect on fibers
 - Ph of everyday chemicals
 - Crystals on slides
- B. Experiments performed primarily in the photography/art labs include:
 - Safety as an artist
 - Painting the "original"
 - Mixing light colors

- Mixing pigment colors
- Photography with a microscope
- Photography with a 35 mm camera
- The camera as an instrument of science
- The camera as an instrument of art
- Developing film
- Printing the negative

This course was originally intended to attract the art students and to fulfill a required science elective. However, students from a variety of areas including art, business, education, and science have been successful in completing the course. For those students who are somewhat unsure of a specific major, Chemistry of Art has offered the opportunity to experience areas that may be somewhat foreign to them. In many cases students have pursued a new direction of studies after completion of the course. Art oriented students have registered for a traditional chemistry or science course; science oriented students have continued with an art or photography course. Over the years Chemistry of Art has remained a non-traditional course that continues to enhance the humanities in science and promote the science of art.

Those who have taken this course perhaps appreciate more fully the bonds and commonalities existing between the science and arts--where creativity is common to both, and where hands-on experience, visualization, and critical thinking can become one.

Additional Reading:
 The Chemistry of Art: A Sequel.
 (April, 1981), Journal of Chemical Education